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# Applying Theory of Planned Behavior in Predicting of Patient Safety Behaviors of Nurses

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## ABSTRACT

**Background:** Patient safety has become a major concern throughout the world. It is the absence of preventable harm to a patient during the process of health care, ensuring safer care is an enormous challenge, psychosocial variables influences behaviors of human. The theory of planned behavior (TPB) is a well-validated behavioral decision-making model that has been used to predict social and health behaviors. This study is aimed to investigate predictors of nurse's patient safety intentions and behavior, using a TPB framework. **Methods:** Stratified sampling technique was used to choose 124 nurses who worked at the selected hospitals of Isfahan in 2011. Study tool was a questionnaire, designed by researchers team including 3 nurses a physician and a psychologist based on guideline of TPB model. Questionnaire Validity was confirmed by experts and its reliability was assessed by Cronbach's alpha as 0.87. Binary logistic regression analysis was performed to evaluate how well each TPB variables predicted the variance in patient safety behavior. Analyzing was done by SPSS18. **Results:** Finding revealed that normative beliefs" had the greatest influence on nurses intention to implement patient safety behaviors. Analyzing data by hospital types and workplace wards showed that both in public and private hospitals normative beliefs has affected safety behaviors of nurses more than other variables. Also in surgical wards, nurses behaviors have been affected by " control beliefs" and in medical wards by normative beliefs. **Conclusion:** Normative beliefs, and subjective norms were the most influential factor of safety behavior of nurses in this study. Considering the role of cultural context in these issues, it seems education of managers and top individuals about patient safety and its importance is a priority also control believes were another important predicting factor of behavior in surgical wards and intensive care units. Regarding the complexity of work in these spaces, applying medical guidelines and effective supervision must be seriously followed.

**Key words:** nurses, patient safety, psychology, theory of planned behavior (TPB).

## 1. INTRODUCTION

The health service is a highly pressured, complex system where the potential for error and accidents is ever present. Patient safety has become a major concern throughout the world. it is the absence of preventable harm to a patient during the process of health care. The discipline of patient safety is the coordinated efforts to prevent harm, caused by the process of health care itself, from occurring to patients (1).

It is a new healthcare discipline that emphasizes the reporting, analysis, and prevention of any hazard that leads to adverse healthcare events. Recognizing that healthcare errors impact 1 in every 10 patients around the world, the World Health Organization calls patient safety an endemic concern (2). Indeed, patient safety has emerged as a distinct healthcare discipline supported by an immature yet developing scientific framework (3).

Although patient safety has been increasingly recognized as an issue of global importance, but much work remains to be done and ensuring safer care is an enormous challenge. Medi-

cal error rates have been quoted to be in the level of 5 -15% per hospital admission in the developed world. Information about the overall state of patient safety in developing countries is less well known, due to data shortage (4).

It is obvious that patient safety is a critical issue in health care systems that can lead to improvement in service quality. International research suggests that ensuring patient safety is becoming one of the most important challenges facing healthcare today (5).

Studying about patient safety can help the international health-care community make another step towards this ambitious but essential goal (4). As it is clear one of the factors, affecting patient safety is the medical team's behavior and it could be said that patient safety somehow is depended to how to act healthcare workers.

We know decision-making for specific behaviors were influenced by psychological issues i.e psychosocial variables influences behaviors of human. One of the most reasonable theories

has been suggested for demonstrating human behavior yet, is the theory of planned behavior (TPB).

According to TPB, human action is guided by three kinds of considerations: beliefs about the likely outcomes of the behavior and the evaluations of these outcomes (behavioral beliefs), beliefs about the normative expectations of others and motivation to comply with these expectations (normative beliefs), and beliefs about the presence of factors that may facilitate or impede performance of the behavior and the perceived power of these factors (control beliefs) (6).

In their respective aggregates, behavioral beliefs produce a favorable or unfavorable attitude toward the behavior; normative beliefs result in perceived social pressure or subjective norm; and control beliefs give rise to perceived behavioral control. In combination, attitude toward the behavior, subjective norm, and perception of behavioral control lead to the formation of a behavioral intention. As a general rule, the more favorable the attitude and subjective norm, and the greater the perceived control, the stronger should be the person's intention to perform the behavior in question. Finally, given a sufficient degree of actual control over the behavior, people are expected to carry out their intentions when the opportunity arises. Intention is thus assumed to be the immediate antecedent of behavior. However, because many behaviors pose difficulties of execution that may limit volitional control, it is useful to consider perceived behavioral control in addition to intention. To the extent that perceived behavioral control is veridical, it can serve as a proxy for actual control and contribute to the prediction of the behavior in question. The Figure 1 is a schematic representation of the theory (7). The TPB has been widely applied to health-related fields such as physical activity, safety action, mental health and exercise. Hung et al. (2008) has used this model to explore the determinants of precautionary behavior to avoid food contain-

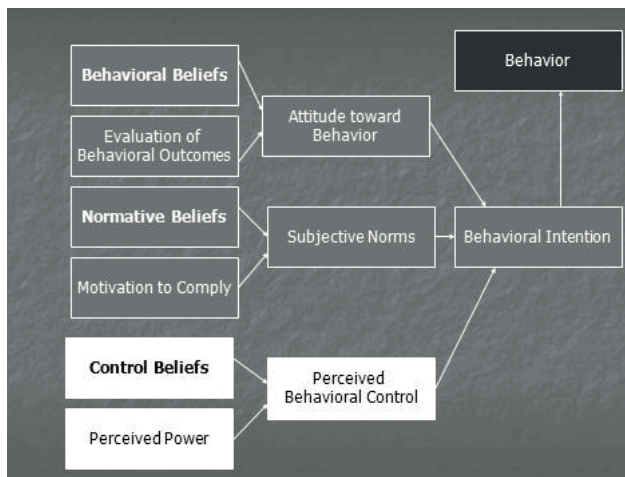


Figure 1. The theory of planned behavior is a well-validated behavioral decision-making model that has been used to predict social and health behaviors (8)

ing dairy products among Taiwanese college students (9). Leandro (2012) applied this model to determine model of speed selection in a sample of young drivers in Costa Rica (10). Pawlak (2009) in east Carolina also using the TPB, were assessed the factors important to college baseball players regarding intention to eat a healthful diet (11). Wakefield (2010) applied the TPB to develop an understanding of the factors that influence patient safety-related behaviors by nurses, doctors and allied health in

an Australian medical center (12). Hamilton (2011) also carried out a study to investigate, via adopting a theory of planned behavior framework and incorporating additional normative and demographic influences, mothers' complementary feeding intentions and behavior (13). As mentioned, patient safety is an important but difficult behavior that can lead to improvement in health care quality. The aim of the current study is to investigate, using a TPB framework, predictors of nurse's patient safety intentions and behavior.

## 2. METHODS

Out of 124 nurses, who were being worked up 2 years in Isfahan hospitals, participated in this descriptive analytical study. Eight hospitals (4 public and 4 private) were selected randomly. Sample size was estimated through: formula as 140 nurses.

The population studied comprised 124 nurses worked in selected hospitals of Isfahan. In order to provide possibility of comparing results by hospital type and workplace situation, samples were selected through stratified sampling from public and private hospitals and also within each hospital selected from medical and surgical or intensive units.

The numbers of samples were calculated based on their proportional population in each hospital. And then list of nurses who have included criteria was attained from staff affair of hospitals. Determined number of nurses randomly selected from list and was asked to complete questionnaires. Study tool was a questionnaire was prepared to investigate patient safety behaviors and behavior constructs of nurses regarding guideline of Constructing a TPB Questionnaire: Conceptual and Methodological Considerations (7).

The TPB questionnaire was primarily designed by researchers team including 3 nurses a physician and a psychologist. The initial draft was circulated to the members several times and reviewed. By the research team and modifications were carried out formal and content validity of the questionnaire was evaluated by expert nurses in field (hospitals) and a number of academic members. Internal consistency (reliability) of questionnaire was assessed by Cronbach's alpha coefficient using a sample consisted of 20 randomly nurses as 0.87.

The questionnaire consisted of a total of 65 Questions and included two sections ; the first section include 10 questions to address independent variable i.e. patient safety behaviors (10 question) which were measured as self-reporting, and the second include 56 questions to address dependent variables i.e. TPB construct. All variables of the study were rated on a Likert scale anchored from strongly disagree (1) to strongly agree (5) for each of the 55 items. The variable score of normative beliefs (4 items), control beliefs (6items), power of control factors (6items), behavioral beliefs (10items), motivation to comply (4items), perceived behavioral, subjective norms, attitude and intention (15items), outcome evaluation (10items) was determined by calculating a mean score of all statements related to each of the above variables.

To facilitate calculating scores, Questions set at 5-point (0-100) Likert scale. Binary logistic regression analysis was performed to evaluate how well each TPB variables predicted the variance in patient safety behavior. For applying Binary logistic regression the values of dependent variables recoded as: values > 70 (high level safety behavior), and values < 70 (low level safety behaviors). Analyzing was done by SPSS<sub>18</sub>.

### 3. RESULTS

Results of this study showed that 124 nurses were completed questionnaires (respondent rate 88.5%) from which 86 (69.4%) nurses were occupied in public and 38 (30.6%) in private hospitals. From all participant nurses 60 nurses (48.4%) were occupied in surgical wards and 64 (51.6%) in medical units.

variables of the TPB	Sig	O.R	Wald	B
outcome evaluation	.262	.673	1.256	-.396
Perceived Behavioral Control, Subjective Norm, Attitude, and Intention	.162	.584	1.952	-.538
Motivation to Comply	.141	1.696	2.168	.528
control beliefs	.358	1.377	.844	.320
Power of Control Factors	.223	1.373	1.487	.317
normative beliefs	.001	1.749	10.899	.559
behavioral beliefs	.300	1.324	1.074	.281

Table 1. Impact of variables of the TPB on safety Behavioral Intention of nurses (all respondents).

Calculating binary logistic regression: as evident from Table 1, indicated that "normative beliefs" had the greatest influence on nurses intention to implement patient safety behaviors. (wald = 10.899,  $P = .001$ ). Comparing self-reporting patient safety functions of nurses in surgical and medical units showed that nurses worked in surgical units have reported their safety functions higher than they who worked in medical units but this difference was not significant ( $p.v = 0.1$ ) (Table 2).

Wards	percent	N	Mean	S.D	t	p.v
Surgical	48.4	60	78.88	16.01	1.8	0.1
Medical	51.6	64	73.30	17.01		

Table 2. Comparing self-reporting patient safety functions of nurses in surgical and medical units

Comparing self-reporting patient safety functions of nurses in public and private hospitals showed that nurses worked in public hospitals have reported their safety functions higher than they worked in private hospitals but this difference was not significant ( $p.v = 0.5$ ) (Table 3).

Hospitals	Percent	N	Mean	S.D	t	p.v
Public	69.4	86	76.58	16.3	0.5	0.57
Private	30.6	38	74.70	17.7		

Table 3. Comparing self-reporting patient safety functions of nurses in public and private hospitals

In another section same calculations were done and data were analyzed by the workplace ward and the hospital type. Exhibited results in Table 4 indicate that in public hospitals nurses "normative beliefs with" (wald = 7.090,  $P = .008$ ) and private hospitals nurses "normative beliefs" with (wald = 4.987,  $P = .026$ ) has affected safety behaviors of nurses more than other variables. Impact of variables of the TPB on safety Behavioral Intention of nurses, presented in Table 5 (by surgical and medical wards) calculated by logistic regression.

### 4. DISCUSSION

The present study showed that normative beliefs had the greatest influence on nurses intention to implement patient safety behaviors (wald = 10.899,  $P = .001$ ) (Table 1).

We know that beliefs about the normative expectations of others and motivation to comply with these expectations

Hospital	public				Private			
variables of the TPB	sig	O.R	wald	B	sig	O.R	wald	B
-outcome evaluation	.422	.697	.645	-.361	.302	.464	1.065	-.767
Perceived Behavioral Control, Subjective Norm, Attitude, and Intention	.443	.677	.588	-.390	.280	.464	1.167	-.767
Motivation to Comply]	.800	1.127	.064	.119	.077	3.801	3.126	1.335
control beliefs	.588	.766	.293	-.267	.214	2.073	1.543	.729
Power of Control Factors	.043	2.000	4.114	.693	.301	.568	1.068	-.565
normative beliefs	.008	1.813	7.090	.595	.026	2.063	4.987	.724
behavioral beliefs	.079	1.917	3.085	.651	.639	1.301	.221	.263

Table 4. Impact of variables of the TPB on safety Behavioral Intention of nurses (by public and private hospitals) - Result of Binary logistic regression

Wards	surgical				medical			
variables of the TPB	sig	O.R	wald	B	sig	O.R	wald	B
-outcome evaluation	.753	.843	.099	-.170	.326	.562	.966	-.577
Perceived Behavioral Control, Subjective Norm, Attitude, and Intention	.081	.087	3.045	-2.446	.193	.550	1.696	-.597
Motivation to Comply]	.530	1.474	.395	.388	.235	1.884	1.408	.634
control beliefs	.025	5.727	5.019	1.745	.191	.496	1.709	-.701
Power of Control Factors	.455	1.401	.559	.337	.907	.955	.014	-.046
normative beliefs	.186	1.466	1.745	.382	.006	2.419	7.569	.883
behavioral beliefs	.716	1.156	.132	.145	.059	2.757	3.556	1.014

Table 5. Indicates that in surgical wards, nurses behaviors have been affected by "control beliefs" (wald = 5.019,  $P = .025$ ) and in medical wards by "normative beliefs" (wald = 7.569,  $P = .006$ )

(normative beliefs) is a construct of TPB (6). This finding is consistent with results of a study conducted in East Carolina University which declared Attitude, subjective norms, and perceived behavior control variables accounted for 72% of the variance in behavioral intention to eat a healthful diet (12). And also is consistent with another study conducted in Australia which reported Attitude and subjective norm, but not perceived behavioral control, were correlated with behavior, with intention emerging as the strongest behavioral correlate (12).

Another finding of present study was that the nurses who worked in surgical units have reported their safety functions higher than they who worked in medical units but this difference was not significant ( $p.v = 0.1$ ) (Table 2). Although this difference was not significant but the sensitivity of safety in surgical wards and intensive units is undeniable, one of the most common reasons of this condition is the effect of complexity and technology used in emergency and intensive care units and highly technical procedures which to be applied there. As Kohn mentioned, in hospitals, high error rates with serious consequences are most likely in intensive care units, operating rooms and emergency departments (14). According to the results, comparing self-reporting patient safety functions of nurses in public and private hospitals showed that nurses who worked in public hospitals have reported their safety functions higher than ones who worked in private hospitals but this difference was not significant ( $p.v = 0.5$ ) (Table 3). This finding is somehow reasonable. In the literature review also there was found no evidence about difference of patient safety issues in private and public hospitals.

Base on results which exhibited in (Table 4), in public hospitals normative beliefs (wald = 7.090,  $P = .008$ ) and in private hospitals, normative beliefs (wald = 4.987,  $P = .026$ ) has affected safety behaviors of nurses more than other variables. These results are consistent with those of the prior studies by Spence and



Townsend (2006) (15), Hung et al. (2010) (9), Leandro (2012) (12) in showing that subjective norms, significantly predict the intention to act a specific behavior.

In another study Moser et al. (2005) conducted a cross-sectional survey to determine the psychosocial predictors of fruit and vegetable consumption among African-American men aged 35 years and older, results indicated that subjective norms were one psychosocial predictor of fruit and vegetable consumption (16).

Berg (2002), also found that parental norms influence breakfast choices among 11- to 15-year-old children (17). That is, the evidence indicates that subjective norms is a strongest predictors of behavioural intentions among all TPB components. Although this claim is contrary to the finding of prior meta-analyses conducted by Notani (1998), Ravis and Sheeran (2003), which reported that attitude is the strongest predictor of behavioral intentions among all TPB antecedent components (18, 19). The results revealed that in surgical wards, nurses behaviors have been affected by control beliefs ( $wald = 5.019, P = 0.025$ ) and in medical wards by normative beliefs ( $wald = 7.569, P = .006$ ) (5) (Table 5) indicates. This is probably concerned to specific condition and complexity of tasks and processes in surgical wards. Surgery is often associated with a considerable risk of complications and death. Mortality is an inevitable complication of surgery (20). It is clear that operative complexity plays a major role in operative mortality and occurring events (21). So the surgical wards are usually facing with specific safety issues, and usually be advised to apply surgical guidelines and set rules to assure accuracy of work. Clinical guidelines lead to standardize medical care, to raise quality of care, to reduce several kinds of risk etc. It has been demonstrated repeatedly that the use of guidelines by healthcare providers is an effective way of achieving the mentioned objectives. As stated before, in medical wards normative beliefs were stronger predictor of intentions. This finding is according to results of Wakefield study which stressed perceptions about the patient safety related behaviors of one's professional colleagues ("a normative factor") has been as influencing factor of high-level patient safety (12) and a study conducted by Leonardo which has pointed that significant others play an important role in speed selection during the driving (10). It is also consistent with results of hung study which showed that subjective norms, attitude, perceived behavioural control, attention to news, and perceived credibility of information are significantly associated with the intention to take precautionary behavior in consuming foods (9).

## 5. CONCLUSION

Analysis of the safety behavior of nurses from various aspects suggests the importance and more stronger role of normative beliefs construct contrary to some another studies which reported that construct of attitude is the higher predictor of behavior, in present study normative beliefs, and subjective norms were the most influential factor of safety behavior of nurses. This fact is a cultural factor, that individuals usually comply with outstanding or reference individuals in their work areas. so it seems education of managers and top individuals about patient safety and its importance is a priority.

In present study control beliefs were another important predicting factor among TPB constructs. This factor was predominant specifically in surgical wards and intensive care units are

facing with complexity and should be used medical guidelines so working based on guide lines must be seriously followed to confirm the patient safety behaviors in nurses.

## REFERENCES

1. World Health Organization. About patient safety. Available from: <http://www.who.int/patientsafety/about/en/index.html>
2. World Alliance for Patient Safety. Organization Web Site. World Health Organization. <http://www.who.int/patientsafety/en/index.html>. Retrieved 2008-09-27.)
3. Palmieri PA. et al. The anatomy and physiology of error in adverse health-care events. *Advances in Health Care Management*. 2008; 7: 33-68. doi:10.1016/S1474-8231(08)07003.
4. World Health Organization. 2010. Patient Safety Workshop Learning From Error. Available from: [www.who.int/patient\\_safety/vincristine\\_learn](http://www.who.int/patient_safety/vincristine_learn).
5. Design for patient safety , A System-Wide Design-Led Approach to Tackling Patient Safety in the NHS. Available from: [www.doh.gov.uk/designforpatientsafety](http://www.doh.gov.uk/designforpatientsafety).
6. Ajzen I. The theory of planned behaviour. *Organizational Behavior and Human Decision Processes*. 1991; 50: 179-211.
7. Ajzen I. Constructing a TPB Questionnaire: Conceptual and Methodological Considerations. September, 2002, (Revised January, 2006). Available from: [http://people.umass.edu/ajzen/tpb\\_measurement](http://people.umass.edu/ajzen/tpb_measurement).
8. Armitage CJ, Conner M. Efficacy of the theory of planned behaviour: a meta-analytic review. *British Journal of Social Psychology*. 2001; 40: 471-499.
9. Hung-Yi Lu, Hsin-Ya Hou, Tzong-Hong Dzwo, Yi-Chen Wu, James E. Andrews, Shao-Ting Weng, Mei-Chun Lin, Jun-Ying Lu. Factors influencing intentions to take precautions to avoid consuming food containing dairy products. Expanding the theory of planned behavior. *British Food Journal*. 2010; 112: 919-933.
10. Mauricio L. Young drivers and speed select in: A model guided by the Theory of Planned Behavior Original Research Article Transportation Research Part F: Traffic Psychology and Behaviour. 2012; 15: 219-232.
11. Pawlak Roman, Malinauskas Brenda, Rivera David. Predicting Intentions to Eat a Healthful Diet by College Baseball Players: Applying the Theory of Planned Behavior. *Journal of Nutrition Education and Behavior*. 2009; 41(5):334-339.
12. Wakefield John G, McLaws Mary-Louise , Whitby Michael, Patton Leanne. Patient safety culture: factors that influence clinician involvement in patient safety behaviours. *Int J Qual Saf Health Care*. 2010 Aug; 22(7): doi: 10.1136/qshc.2008.030700
13. Hamilton Kyra, Daniels Lynne, White Katherine M, Murray Nicole, Walsh Anne. Predicting mothers' decisions to introduce complementary feeding at 6 months. An investigation using an extended theory of planned behaviour. *Appetite*. 2011; 56: 674-681.
14. Kohn KT, Corrigan JM, Donaldson MS, Editors. To Err Is Human, Building a Safer Health System. Committee on Quality of Health Care in America Institute of Medicine. National Academy Press, Washington, D.C., 2000.
15. Spence A, Townsend, Examining consumer behavior toward genetically modified (GM) food in Britain. *Risk Analysis*. 2006; 26: 657-670.
16. Moser RP, Green V, Weber D, Doyle C. Psychosocial correlates of fruit and vegetable consumption among African American men. *Journal of Nutrition Education and Behavior*. 2005; 37: 306-314.
17. Berg C. Influences on Swedish schoolchildren's dietary selection: focus on fat and fibre at breakfast. *Scandinavian Journal of Nutrition*. 2002; 46: 194-196.
18. Notani AS. Moderators of perceived behavioral control's productiveness in the theory of planned behavior: a meta-analysis. *Journal of Consumer Psychology*. 1998; 7: 247-271.
19. Ravis A, Sheeran P. Descriptive norms as an additional predictor in the theory of planned behavior: a meta-analysis. *Current Psychology*. 2003; 22: 218-233.
20. Hayes AB, Weiser TG, Berry WR. et al. A surgical safety checklist to reduce morbidity and mortality in a global population. *NEM J*. 2009; 360 : 491-499.
21. Bradley Aust J, Henderson W, Khuri S, Page CP. The Impact of Operative Complexity on Patient Risk Factors. *Ann Surg*. 2005; 241: 1024-1028. doi: 10.1097/01.sla.0000165196.32207.